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EXAMINER	
DUONG, THOI V	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 11/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/512,107	KUMAGAI ET AL.	
	Examiner	Art Unit	
	Thoi V Duong	2871	

-- The MAILING DATE of this communication appears on th cover sh t with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 August 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-6,13 and 16-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *5 and 6* is/are allowed.

6)☒ Claim(s) *2-4,13 and 16-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. This office action is in response to the Amendment filed August 14, 2003.

Accordingly, claims 2, 5, 13, 16 and 17 were amended and claims 1, 7-12, 14 and 15 were previously cancelled. Currently, claims 2-6, 13 and 16-18 are pending in this application.

Response to Arguments

2. With respect to claims 3 and 18, Applicant's arguments filed 08/14/2003 have been fully considered but they are not persuasive.

Applicant argued that the method of Tsuda et al. for forming the unevenness of the picture element is performed by the backside exposure using the auxiliary capacity of the gate layer as a mask, this method is different from the claimed invention which does not use any pattern formed on the substrate as a mask. The Examiner disagrees with the Applicant's remarks since the limitation "does not use any pattern formed on the substrate as a mask" is not recited in the claims.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 13 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuda et al. (US 6,262,783 B1) in view of Shimada et al. (US 6,052,162) and

As shown in Figs 1 and 2, Tsuda discloses a reflection type liquid crystal display (as well as a method for manufacturing the same) comprising:

a transparent insulating substrate 201;

scanning lines 204, a scanning electrode 203, and common electrode 205 wiring formed on said insulating substrate;

an insulating film 207 formed on said scanning lines, said scanning electrode and said common electrode wiring;

a semiconductor layer 208 (see also Fig. 3C) formed on said scanning electrode through said insulating film;

a first electrode 212 and a second electrode 213 forming a semiconductor element with said semiconductor layer, and signal lines 211 connected to said first electrode;

an innerlayer photosensitive insulating film 240 which is formed on said first electrode, said second electrode and said signal lines, absorbs difference in level of said scanning lines, said first electrode, said second electrode and said signal lines, and possesses minute unevenness on the surface (col. 9, lines 12-25) serving as an inseparable pattern on the surface (Fig. 2);

a first transparent substrate 201 (col. 1, lines 52-54) having a reflex picture element electrode 423 composed of a high reflex metal film Al (col. 9, lines 47-50) having a configuration transferred to said interlayer insulating film as the unevenness on the surface of said interlayer insulating film and electrically connected to said second

electrode through a contact hole provided in said interlayer insulating film (Fig. 5B) and serving as a separable pattern; and

a second transparent substrate 301 sandwiching and holding a liquid crystal material 250 with said first substrate (col. 1. lines 52-54), which is provided with a color filter 303, an opposed electrode 303 and so on.

Tsuda et al. also discloses another interlayer insulating film 422 having desired unevenness on the surface of another predetermined position by conducting exposure at a different exposure amount using another mask on said resin and development (Fig. 5A and col. 9, lines 26-45).

Tsuda et al. discloses a reflection type liquid crystal display that is basically the same as that recited in claim 13 except for an interlayer insulating film composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength, and a semiconductor film composed of the same film as said semiconductor layer and formed in a picture element region excluding the region where said scanning lines, said signal lines and said contact holes are formed.

At first, as shown in Fig. 2, Shimada et al. discloses a liquid crystal display comprising an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to increase the brightness of the display (col. 5, lines 38-42 and col. 9, lines 29-48). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reflection type liquid crystal display of Tsuda et al. with the teaching of Shimada et al. by forming an interlayer insulating film 38 composed

of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength to improve the display brightness.

Further, as shown in Figs. 7 and 10, Mei et al. discloses a liquid crystal display comprising an a-Si semiconductor layer 64 (as 52 in Fig. 4; col. 4, lines 39-41) and an a-Si semiconductor film 68 which is provided to improve absorption of the UV radiation during lithography process for forming a channel region of the display (col. 2, lines 30-36 and col. 6, lines 45-55). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the liquid crystal display of Tsuda et al. with the teaching of Mei et al. by forming a semiconductor film composed of the same film as said semiconductor layer in a picture element region excluding the region where said scanning lines, said signal lines and said contact holes are formed to improve absorption of the UV radiation during lithography process.

As to the product-by-process limitation "said inseparable pattern and separable pattern are arranged respectively in different masks and exposed separately; and said inseparable pattern is exposed with a predetermined exposure amount of 20 to 80% of the exposure amount for said separable pattern" of claim 13, it has been recognized that "Even through product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior art product was made by a different process". *In re Thorpe*, 227 USPQ 964,966 (Fed. Cir. 1985). See also MPEP 2113.

5. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuda et al. (US 6,262,783 B1) in view of Shimada et al. (US 6,052,162) and Kiryu et al. (US 5,368, 962).

As shown from Figs. 3A to 5D Tsuda et al. discloses a method for manufacturing a reflection type liquid crystal display wherein two transparent insulating substrates 201 and 310, in which an electrode is formed on at least one of them, are arranged to be opposite and adhered to each other and a liquid crystal material 250 is held between said two transparent insulating substrates, the method including the steps of:

forming scanning lines (not shown), a scanning electrode 203, and common electrode wiring 205 on a transparent insulating substrate 201;

forming an insulating film 207 on said scanning lines, said scanning electrode and said common electrode wiring;

forming a semiconductor layer 208 on said scanning electrode through said insulating film;

forming a first electrode 212 and a second electrode 213 forming a semiconductor element 230 with said semiconductor layer (see Fig. 2), and forming signal lines 211;

forming an interlayer insulating film 240 having a contact hole at a predetermined position and desired unevenness on the surface by applying photosensitive resin on said first electrode, said second electrode and said signal lines, and conducting exposure using a mask and development (Fig. 4B and col. 8, line 66 through col. 9, line 25); and

forming a reflex picture element electrode 423 having a configuration of transferred unevenness on the surface of said interlayer insulating film and electrically connected to said second electrode through said contact hole by forming a high reflex metal film (Al) on said interlayer insulating film and in said contact hole, and conducting patterning (Fig. 5D and col. 9, lines 46-54).

Tsuda et al. discloses a reflection type liquid crystal display that is basically the same as that recited in claim 13 except for forming an interlayer insulating film composed of a photosensitive positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength, and sticking an ultraviolet-cut film on a face of the transparent insulating film opposite to the face where said photosensitive positive-type resin is applied.

As shown in Fig. 2, Shimada et al. discloses a liquid crystal display comprising an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to increase the brightness of the display (col. 5, lines 38-42 and col. 9, lines 29-48). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reflection type liquid crystal display of Tsuda et al. with the teaching of Shimada et al. by forming an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to improve the display brightness.

Meanwhile, Kiryu discloses a masking film comprising a peelable, transparent ultraviolet-cut film provided on a transparent substrate for cutting ultraviolet rays having

a wavelength of 450 nm or less (col. 2, lines 33-40). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the method of Tsuda with the teaching of Kiryu by sticking an ultraviolet-cut film on a face of the transparent insulating substrate opposite to the face where said photosensitive positive-type resin is applied for cutting ultraviolet rays having a wavelength of 450 nm or less.

6. Claims 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuda et al. (USPN 6,262,783 B1) in view of Shimada et al. (US 6,052,162) and Takatsu et al. (USPN 5,434,026).

As shown from Figs. 1, 2, and 3A-5D, Tsuda discloses a method for manufacturing the above reflection type liquid crystal display, comprising:

forming plural scanning lines 204 and plural signal lines 211 crossing said scanning lines on an insulating substrate 201;

forming a switching element 230 in each of picture element regions divided by said scanning lines and said signal lines;

forming an interlayer insulating film 240 having appropriate unevenness of an inseparable pattern in the picture element region and having a contact hole of a separable pattern on a drain electrode 213 of said switching element (Fig. 2) by plainly applying a photosensitive insulating resin on said substrate so as to dissolve difference in level caused by said scanning lines, said signal lines, and said switching element, and conducting exposure and development while changing an amount of exposure (col. 8, line 66 through col. 9, line 45); and

forming a reflex picture element electrode 423 having unevenness due to said interlayer insulating film at a position conforming to each of the picture element regions and which is electrically connected to said switching element through said contact hole, by patterning after forming a high reflex film on said interlayer insulating film (Fig. 5D),

wherein in the process of forming the interlayer insulating film, the insulating resin is exposed by divisional (split) exposure in which the inseparable pattern and the separable pattern are exposed by different masks as shown in Figs. 4B and 5A.

Tsuda discloses a method for manufacturing a reflection type liquid crystal display that is basically the same as that recited in claims 2 and 4 except for the exposure value of the separable pattern and the inseparable pattern, and an interlayer insulating film composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength.

Takatsu et al. discloses a quick and accurate method of determining exposure conditions for an exposure device such as a stepper for manufacturing a liquid crystal display device (col. 1, lines 12-19). As shown in Fig. 1C, a photoresist layer at position b1 is exposed to light intensity of 20 and a photoresist layer at position a1 is exposed to light intensity of 75 so as to obtain an accurate film reduction (col. 3, lines 24-27 and col. 4, lines 27-31). Accordingly, the photoresist layer at position b1 is exposed by a predetermined exposure amount of 27 % of the exposure amount for the photoresist layer at position a1. Thus, it would have been obvious that the method of Takatsu et al. is applicable for predetermining exposure conditions for the separable pattern and the inseparable pattern so as to obtain a desired insulating resin having appropriate

unevenness of the inseparable pattern in the picture element region and having a contact hole of the separable pattern.

Meanwhile, as shown in Fig. 2, Shimada et al. discloses a liquid crystal display comprising an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength so as to increase the brightness of the display (col. 5, lines 38-42 and col. 9, lines 29-48). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the reflection type liquid crystal display of Tsuda et al. with the teaching of Shimada et al. by forming an interlayer insulating film 38 composed of a positive-type resin having a sensitivity to an i-line of 365 nm in wavelength and an h-line of 405 nm in wavelength to improve the display brightness.

7. Claims 3 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuda et al. (USPN 6,262,783 B1) in view of Kiryu et al. (USPN 5,368,962).

As shown from Figs. 1, 2, and 3A-5D, Tsuda discloses a method for manufacturing the above reflection type liquid crystal display, comprising:

forming plural scanning lines 204 and plural signal lines 211 crossing said scanning lines on an insulating substrate 201;

forming a switching element 230 in each of picture element regions divided by said scanning lines and said signal lines;

forming an interlayer insulating film 240 having appropriate unevenness of an inseparable pattern in the picture element region and having a contact hole of a separable pattern on a drain electrode 213 of said switching element (Fig. 2) by plainly

applying a photosensitive insulating resin on said substrate so as to dissolve difference in level caused by said scanning lines, said signal lines, and said switching element, and conducting exposure and development while changing an amount of exposure (col. 8, line 66 through col. 9, line 45); and

forming a reflex picture element electrode 423 having unevenness due to said interlayer insulating film at a position conforming to each of the picture element regions and which is electrically connected to said switching element through said contact hole, by patterning after forming a high reflex film on said interlayer insulating film (Fig. 5D).

As shown in Fig. 4A, Tsuda also discloses a mask comprising a light-shielding region such as the gate signal line 204 and the common electrode line 205 made of light-shielding material (col. 9, lines 2-7). Tsuda discloses a method for manufacturing a reflection type liquid crystal display that is basically the same as that recited in claims 3 and 18 except for a mask having an ultraviolet filter layer for cuttings uv rays at a predetermined value of 20 to 80 % in a base material. Kiryu et al. discloses a masking film comprising a peelable, transparent UV filter layer provided on a transparent substrate for cutting ultraviolet rays. As shown in Fig. 4, the spectral transmittance of the masking film is greater than 50 % (col. 2, lines 1-14 and col. 5, lines 10-25). Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of with the teaching of Kiryu by applying a peelable, transparent UV filter layer on the substrate 201 (Fig. 4A) as a shading material for cutting the UV rays at a predetermined value.

Allowable Subject Matter

8. Claims 5 and 6 are allowed.

The following is an examiner's statement of reasons for allowance: none of the prior art of record fairly suggests or shows all of the limitations as claimed. Specifically,

Re claim 5, none of the prior art of record discloses, in combination with other limitations as claimed, a mask for manufacturing a reflection type liquid crystal display comprising a base material and a shading material of at least two layers provided on said base material, wherein said at least two layers including an ultraviolet filter comprising an amorphous Si film of 1 nm to 10 nm (or 10 to 100 Angstrom) in thickness for cutting ultraviolet rays at a predetermined value of 20 to 80 %.

The most relevant references, USPN 5,368,962 of Kiryu et al. and UsPN 5,994,157 of Aggas et al., fail to disclose or suggest an ultraviolet filter comprising an amorphous Si film of 1 nm to 10 nm in thickness for cutting ultraviolet rays at a predetermined value of 20 to 80 %. The reference of Kiryu et al. only discloses a mask comprising a transparent substrate and a peelable, transparent shading layer made of a mixture of a yellow colorant and a blue colorant (col. 3, lines 8-11 and 34-40). Meanwhile, the reference of Aggas et al. discloses only an UV blocking layer formed of a-Si and having a thickness of from about 200 to 2000 Angstrom for cutting ultraviolet rays at about 80% (col. 7, lines 7-31).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (703) 308-3171. The examiner can normally be reached on Monday-Friday from 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim, can be reached at (703) 305-3492.

Thoi Duong

11/02/2003

T. Chowdhury
Primary Examiner.